REMARKS:

1) Referring to item 10) of the Office Action Summary, the Examiner is respectfully requested to indicate the acceptance of the drawings filed on September 19, 2005.

2) In the enclosures of the Office Action, the Examiner has returned an initialed and signed acknowledgment copy of our IDS Form PTO-1449 of September 19, 2005. However, the Examiner has crossed out reference "AG" (GB 797 208) because no copy of this reference was provided. It should not have been necessary to provide a further copy of GB 797 208 with the Information Disclosure Statement, because **that reference had been cited in the International Search Report in the international stage of this PCT application**. Thus, **a copy of GB 797 208 should have been provided to the USPTO together with the International Search Report directly from the International Searching Authority**. See M.P.E.P. 609 II and 1893.03(g). Since a copy of the reference was apparently not provided to the USPTO by the International Searching Authority, **we are now enclosing a copy for the Examiner's consideration**. Please consider the reference and return a completely initialed, signed and dated acknowledgment copy of the IDS Form PTO-1449 of September 19, 2005.

3) According to the PCT procedures, the original specification of this application was a direct literal translation of the PCT International Application text. The specification has now been amended formally to better comply with typical US application

format, e.g. by inserting section headings and avoiding direct numerical references to the claims. The specification has also been amended editorially to improve the use of idiomatic English grammar and sentence construction, and to correct a few minor errors in reference numbers and the like. These editorial and formal amendments do not introduce any new matter. Entry thereof is respectfully requested.

4) According to the PCT procedures, the original claims of this application were a direct literal translation of the corresponding claims of the PCT International application. The claims have now been amended editorially to improve the streamlining and consistent use of terminology in the claims. Also, the structural arrangement covered by claim 1 has been clarified by expressly reciting that the insulation arrangement comprises an insulation layer, an outer sheath, and first and second termination profiles, and expressly defining the structural arrangement and interconnection of these elements. New claims 20 to 25 have been added. Claim 20 is supported by the subject matter of original claim 1, specification page 6 lines 1 to 11, and Figs. 1, 3 and 4. Claim 21 is supported by the specification at page 6 lines 1 to 11 and Fig. 3. Claim 22 is supported by the specification at page 6 line 4. Claim 23 is supported by the specification at page 8 lines 5 to 6. Claim 24 is supported by the specification at page 8 lines 3 to 13. Claim 25 is supported by the specification at page 6 line 7. Thus, the claim amendments and the new claims do not introduce any new

matter. Entry and consideration thereof are respectfully requested.

5) Referring to the middle of page 2 of the Office Action, the rejection of claims 1, 11, 13, 15, 16 and 19 as anticipated by US Patent 3,904,379 (Oser et al.) is respectfully traversed.

Independent claim 1 as currently amended is directed to a pipe insulation arrangement that comprises at least one insulation layer, an outer sheath consisting of titanium foil, and first and second termination profiles. First and second end sections of the outer sheath are connected respectively with the first and second termination profiles. The outer sheath and the termination profiles thereby form a shell into which the insulation layer can be inserted.

Contrary to present claim 1, the insulation arrangement according to Oser et al. does not comprise at least one insulation layer that is inserted into the outer sheath consisting of titanium foil. Instead, the insulation arrangement according to Oser et al. is purely a reflective insulating structure consisting of plural reflective metal sheets that are stacked and spaced apart from one another (see abstract, col. 1 lines 10 to 29, col. 4 lines 30 to 37, col. 7 lines 11 to 21, etc.). In fact, Oser et al. expressly distinguish the all-metal reflective insulating structure as disclosed from a different type of thermal insulation using blocks of refractory or low-conductivity materials such as ceramics or fibrous materials (col. 1 lines 30 to 35 and 52 to 55).

Thus, Oser et al. do not anticipate the present invention of claim 1, and would have provided no suggestion toward the present invention, because there would have been no motivation or suggestion to use an outer sheath of titanium according to Oser et al. in combination with a thermal insulation layer, because Oser et al. expressly distinguish their invention from the use of such thermal insulation layers, and Oser et al. disclose the use of a titanium sheath only as one of many titanium sheets making up the all-metal reflective insulation structure.

Claims 11, 13, 15, 16 and 19 are patentably distinguishable over the reference already due to their dependence.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 1, 11, 13, 15, 16 and 19 as anticipated by Oser et al.

6) Referring to pages 2 and 3 of the Office Action, the rejection of claims 1, 2, 11 to 16 and 19 as obvious over US Patent 4,287,245 (Kikuchi) in view of Oser et al. is respectfully traversed.

Present amended claim 1 recites that the insulation arrangement comprises first and second termination profiles. Particularly <u>first and second end sections of the titanium outer sheath are connected respectively with the first and second termination profiles to thereby form a shell</u> from the outer sheath and the termination profiles. The insulation layer can be inserted into this shell.

Kikuchi discloses an insulation arrangement formed of plural insulating units (A) that are joined in the transverse or circumferential direction around the pipe to form a complete hollow cylindrical insulating unit, and then arranged and connected to one another in series to cover a pipe over its full length. In order to achieve an improved seal effect, the longitudinal joint surfaces (2a) and the semi-cylindrical transverse joint surfaces (2b) preferably have a stepped configuration as shown in Figs. 3 and 4 (col. 7 lines 48 to 59). These stepped configurations are merely a stepped shape of the end surface of the foamed resin insulating element (2). There is no termination profile provided and connected to the end of the outer sheath of the insulating unit. The joint formed between two adjacent insulating units along the stepped faces (2a, 2b) is then sealed with a joint sealer, a foaming adhesive, or other kinds of liquid foaming synthetic resin (col. 7 lines 60 to 63).

Thus, while the Examiner has referred to "*a Z shaped termination profile as seen in figures 3 and 4*", there is actually no such termination profile as a discrete structural component in the arrangement according to Kikuchi. Particularly, Kikuchi does not disclose and would not have suggested that the arrangement should comprise first and second termination profiles in addition to an outer sheath and an insulation layer, particularly whereby first and second end sections are connected respectively to the first and second termination profiles.

Such a provision and arrangement of termination profiles at the longitudinal ends of the outer sheath would have been

contrary to the general teachings and concept of Kikuchi, because Kikuchi aims to achieve an essentially continuous insulation arrangement formed by successive insulation units (A) that are joined and sealed to one another by a foaming sealant along the stepped end surfaces (2b) (col. 3 lines 57 to 60, col. 4 lines 45 to 64, col. 7 lines 58 to 65, etc.). The teaching of forming an essentially continuous insulation arrangement of successive insulation units sealed to one another at the ends thereof is directly contrary to the concept of longitudinally terminating an insulation arrangement with a termination profile. Thus, a person of ordinary skill in the art would have found no suggestion in Kikuchi to provide such a termination profile.

The Examiner has further referred to Oser et al. for disclosing the use of a titanium foil as an outer sheath with stiffening elements. Even if a person of ordinary skill in the art would have formed the outer sheath of the Kikuchi arrangement of titanium, there still would have been no suggestion to provide termination profiles at the two opposite ends of the outer sheath in the presently claimed manner to form a shell to receive an insulation layer therein. As discussed above, Oser et al. disclose an all-metal, purely reflective thermal insulating structure, which does not use a thermal insulation layer, but rather uses only reflective metal sheets stacked with a spacing between one another. Rather than achieving insulation by low conduction (like the invention and like Kikuchi), Oser et al. achieve insulation by reflection of heat. Oser et al. also expressly differentiate between such all-metal reflective insulating structures on the one hand and low-conduction

insulation layer structures on the other hand (col. 1 lines 30 to 55). Thus, teachings of Oser et al. would not have seemed suitable in combination with Kikuchi. Particularly, Kikuchi expressly requires the several successive insulation units to be continuously joined and sealed to one another to form a continuous insulation over the entire length of the pipe, which is directly contrary to, and teaches away from, providing termination profiles at the two opposite ends of each insulation unit. With such termination profiles, the end-to-end joining and sealing would not have been achieved or possible. Thus, even the teachings of end plates (10, 12) according to Oser et al. would not have been reasonably combined with teachings of Kikuchi, and even if considered together would not have suggested the presently claimed arrangement with termination profiles.

Claims 2, 11 to 16 and 19 are patentably distinguishable over the prior art already due to their dependence.

For the above reasons, the Examiner is respectfully requested to withdraw the rejections of claims 1, 2, 11 to 16 and 19 as obvious over Kikuchi in view of Oser et al.

7) Referring to pages 3 and 4 of the Office Action, the rejection of claims 17 and 18 as obvious over Kikuchi in view of Oser et al. and further in view of US Patent 4,576,661 (Persson) is respectfully traversed. Claims 17 and 18 depend from claim 1, which has been discussed above in comparison to Kikuchi and Oser et al. The Examiner has additionally cited the Persson reference with regard to outlet holes and warning wires. While Persson does disclose the arrangement of warning or monitoring wires

along an insulated pipe, there is a significant difference. Present claims 17 and 18 require that the warning wires are arranged above or **outside** of the outlet holes. Contrary thereto, Persson discloses an arrangement in which monitoring wires (5) extend along a pipe (1) while being encased **inside** the pipe insulation (3) (col. 2 lines 9 to 18). There are **no** outlet holes in the outer sheath as presently claimed, but instead the warning wires are intended to detect any dampness within the insulation itself due to a leak from the pipe. That has nothing to do with the arrangement of warning wires above outlet holes provided in an outer sheath as presently claimed. For these reasons, the Examiner is respectfully requested to withdraw the rejection of claims 17 and 18 as obvious over Kikuchi and Oser et al. further in view of Persson.

8) The new claims 20 to 25 have been drafted "from the ground up" in view of typical US claim drafting practice, and with somewhat different claim terminology and style than the original translated PCT claims. These claims define features that distinguish the invention over the prior art, for example as follows. The insulation arrangement of independent claim 20 comprises a cylindrical outer sheath, first and second termination profiles respectively positioned at and connected to first and second end sections of the outer sheath, and a layer of thermal insulation wool inserted into the outer sheath to form a cylindrical insulation wool jacket. This cylindrical insulation wool jacket is received and held by the termination profiles in a cylindrical shell space that is bounded

longitudinally between the termination profiles and bounded radially inside the outer sheath. In view of the above discussion of the prior art references, it is clear that the prior art does not disclose and would not have suggested such an arrangement of termination profiles connected to opposite ends of the outer sheath so as to bound a cylindrical shell space for receiving the insulation wool jacket as presently claimed.

9) Favorable reconsideration and allowance of the application, including all present claims 1, 2 and 11 to 25, are respectfully requested.

Respectfully submitted,
Gerhard HUMMEL et al.
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WFF:he/4874
Enclosures:
Transmittal Cover Sheet
reference "AG" (GB 797 208)

CERTIFICATE OF FAX TRANSMISSION:

I hereby certify that this correspondence with all indicated enclosures is being transmitted by telefax to (571) 273-8300 on the date indicated below, and is addressed to: COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450.

_____ 12/22/06
Name: Walter F. Fasse - Date: December 22, 2006

SN: 10/549,384

RESERVE (AG)

PATENT SPECIFICATION 797,208

Inventor:—GEOFFREY PETER KIRK.

Date of filing Complete Specification: Jan. 11, 1956.

Application Date: Jan. 14, 1955. No. 1163/55.

Complete Specification Published: June 25, 1958.

Index at Acceptance:—Class 99(2), P1B(5D:8).

International Classification:—F06l.

COMPLETE SPECIFICATION.

Improvements in Insulating Shrouds or Blankets.

We, THE BRITISH REFRASIL COMPANY LIMITED, a British Company, of Stillington, County Durham, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to insulating shrouds or blankets for hot pipes, ducts, casings and other parts of machinery, such as gas turbines and like apparatus.

It is known to construct blankets or shrouds for wall surfaces comprising two flat metal sheet elements having heat insulating material, such as vitreous silica fibre, disposed between the sheets. Such blankets are frequently wrapped around curved wall elements or inserted as an internal lining to such elements. To allow such curvature without rupturing or wrinkling the thin sheet elements it has been proposed to form in that sheet element forming the inner curved face, spaced shallow corrugation grooves extending transversely to the direction of curvature across the entire width of the element, which permit expansion or contraction in length of said inner face.

It has been found that as a result of temperature variation insulating shrouds or blankets have to provide for considerable thermal movement both in a linear direction and due to distortion arising from the temperature differential between the inner and outer faces of the shrouds or blankets.

The primary object of the invention is to construct a shroud or blanket which allows for expansion of the covering sheet elements and is of light weight.

According to the present invention an insulating shroud or blanket for covering flat or curved wall surfaces and the like includes two spaced metal sheet elements or skins interconnected at their edges to form a hollow chamber at ambient pressure and an insulating material, such as vitreous silica fibre freely disposed within said chamber, one or both of the sheet metal elements or skins being provided with a plurality of small indentations to provide a dimpled surface.

The invention also includes an insulating shroud or blanket having two sheet metal skins of curved form disposed in spaced relationship, with one or both of said skins provided with a dimpled surface, the space between the skins containing an insulating material resistant to high temperatures freely disposed therein and the skins being interconnected around their edges to form a liquid-tight envelope having its interior space at ambient pressure.

The invention will be hereinafter more fully described with reference to the accompanying drawings showing by way of example embodiments of the invention, and in which:—

Fig. 1 shows a perspective view of a thin metal sheet having a dimpled surface according to the invention;

Fig. 2 is a section along the line II—II of Fig. 1 on a somewhat enlarged scale;

Fig. 3 shows a sectional perspective view of a curved form of blanket constructed according to the invention;

Figs. 4 and 5 show in perspective view and in section respectively one form of breather aperture;

Figs. 6 and 7 show views similar to those of Figs. 4 and 5 of an alternative form of breather aperture.

Referring to Fig. 1, this shows a sheet 10 of metal, such as stainless steel, which is intended to form the outer covering or skin of an insulating shroud or blanket which

[*Price*

may be secured detachably to the member to be insulated or which may alternatively form part of a fixed structure. As will be clear from the Figure, the surface is indented to provide a dimpled surface which may be effected, for example, by passing the sheet through suitably formed rollers.

As shown in Fig. 2, which is a section through the sheet, the indentations may be produced in both directions from the median plane M—M of the metal sheets so that each surface of the sheet is of dimpled form. Whereas the dimpling illustrated in Fig. 1 is of approximate regular pattern the dimpling may, if desired, be irregular and the shape of the indentations may be as desired, while the pitch of the indentations may vary widely according to prevailing conditions.

Fig. 3 shows in sectional perspective view a curved insulating shroud or blanket comprising an outer dimpled skin 14, a spaced inner dimpled skin 16 and in between the skins 14 and 16 is disposed, as indicated at 18, layers of vitreous silica fibre. The curved structure so formed is sealed at its curved edge 20 and at its opposite curved bounding edge (not shown) and also along its edges 22 transverse to the direction of curvature. Where the curved insulating shroud element forms a part of an insulating member of closed form such as circular or elliptical the edges 22 may be made as shown of bevelled form to provide a scarf joint with an adjacent complementary shroud or blanket to which the curved shroud is to be attached so as to maintain a constant thickness of insulation at the joint of the two elements. Studs or like elements 24 are provided adjacent the edges 22 for joining the parts of the shroud or blanket structure together. If desired, the curved edges may be of bevelled form as described with reference to the edges 22.

The sealing of the edges is preferably effected by folding one of the skins over the other at such edges and by applying spot or seam welding along the folded portions. Obviously, any other form of interconnection of the separate skins at the edges of the blanket or shroud may be employed, such as the welding of each skin to a separate edge member of flat or channel or other suitable section. In this way the skins form a liquid-tight envelope which, if desired, may be provided with small apertures in the surface of one of the sheets in order to equalise the internal and external air pressures at all times. One such breather aperture is indicated at 26 in Fig. 3 and the construction of such aperture is indicated more fully in Figs. 4 to 7, as will be hereinafter described. The apertures should be so disposed as to lie in positions where the entry of liquid into the interior of the blanket is unlikely and such entry may, if desired, be obstructed by the provision of wire gauze shields or the like.

Figs. 4 and 5 show one form of breather aperture consisting of a vent hole 28 formed in the sheet metal skin and covered over by a shield member 30 for protective purposes. On the inner face of the dimpled skin 14 a piece of wire gauze 32 is spot welded, the gauze covering the actual vent hole 28 and thus forming an obstruction to the entry of any appreciable amounts of liquid.

An alternative form of breater is shown in Figs. 6 and 7 and this comprises a vent aperture 28 formed in the dimpled skin and covered over completely by a shield 34 of generally circular dished shape, on the inner face of which is secured by spot welding a wire gauze layer 36. The dished member 34 is secured to the surface of the plate 14 by means of a number of spot welds indicated generally at 38 and the dished member 34 is also provided in its dished portion with a plurality of very small holes indicated at 40. Such a construction allows the insulation to breathe and the entry of liquid is obstructed due to the small size of the holes 40 and the provision of the gauze layer 36.

The dimpled surface or surfaces of the sheets add to the strength and stability or rigidity of the shroud or blanket. If necessary, the sheets may be reinforced in some manner as by internal ribbing. The dimpled surface allows for thermal expansion in all directions and also controls flexure of the blanket and thus avoids possible rupture of the thin metal sheets due to distortion. The dimpled surface also reduces the tendency to panting or diaphragm movements of the sheets.

It is also to be observed that air will normally be included in the spaces between the dimples of the dimpled surface and the possibly hot casing with which the sheet metal skin is in contact and this presence of air improves the efficiency of the insulation and avoids local overheating of the covering skin.

The shroud or blanket above-described may be detachably secured to the member to be insulated by any convenient means, such as by lacing wire, straps, hooks, springs or the like. Alternatively, as above-mentioned, the shroud or blanket may form part of a fixed structure, that is to say, may be incorporated in an insulating structure which is not normally removable.

What we claim is:—

1. An insulating shroud or blanket for covering flat or curved wall surfaces and the like and including two spaced sheet metal elements or skins interconnected at their edges to form a hollow chamber at ambient pressure and an insulating material, such as vitreous silica fibre freely disposed within

said chamber, one or both of the sheet metal elements or skins being provided with a plurality of small indentations to provide a dimpled surface.

2. An insulating shroud or blanket according to Claim 1 in which the skin or skins is or are indented in both directions from the median plane of the sheet.

3. An insulating shroud or blanket according to Claim 1 or 2 in which the pattern of the dimpling is irregular.

4. An insulating shroud or blanket having two sheet metal skins of curved form disposed in spaced relationship, with one or both of said skins provided with a dimpled surface, the space between the skins containing an insulating material resistant to high temperatures freely disposed therein and the skins being interconnected around their edges to form a liquid-tight envelope, having its interior space at ambient pressure.

5. An insulating shroud or blanket according to Claim 1 or 4 which includes breather apertures in the outer skin having a shield with or without a wire gauze or the like covering for said apertures.

6. An insulating shroud or blanket according to Claim 4 or 5 in which one or more of the edges of the shroud or blanket are bevelled to provide a scarf joint with an adjacent shroud or blanket thus maintaining constant insulation thickness at the joint.

7. An insulating shroud or blanket constructed and arranged substantially as described with reference to Figs. 3, 4 and 5 or as modified in Figs. 6 and 7 of the accompanying drawings.

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PROVISIONAL SPECIFICATION.

Improvements in Insulating Shrouds or Blankets.

We, THE BRITISH REFRASIL COMPANY LIMITED, a British Company, of Stillington, County Durham, England, do hereby declare this invention to be described in the following statement:—

This invention relates to insulating mats or blankets for hot pipes, ducts, casings and other parts of machinery, such as gas turbines and like apparatus.

It is known to construct blankets for wall surfaces comprising two flat sheet elements having heat insulating material, such as vitreous silica fibre, disposed between the sheets. Such blankets are frequently wrapped around curved wall elements or inserted as an internal lining to such elements.

It has been found that as a result of temperature variation insulating mats or blankets have to provide for considerable thermal movement both in a linear direction and due to distortion arising from the temperature differential between the inner and outer faces of the mats or blankets.

The primary object of the invention is to construct a mat or blanket which allows for expansion of the covering sheet elements and is of light weight.

According to the present invention an insulating mat or blanket of the kind described has its covering sheets formed with a large number of small indentations.

In a preferred construction described by way of example only an insulating mat or blanket is formed by inserting an insulating medium, such as vitreous silica fibre, between two thin metal sheets of, for example, stainless steel.

The surfaces of the sheets are dimpled to provide small indentations, for example, by passing the sheets through suitably formed rollers.

The edges of the sheets are joined to form a liquid-tight envelope which may be provided with apertures over the sheet surfaces to equalize the internal and external air pressures. The apertures are covered by shields, wire gauze or the like.

The dimpled surface of the sheets adds to the strength and rigidity of the mat or blanket. It will be appreciated that the sheets may also be reinforced. The dimpled surface allows for thermal expansion in all directions and also facilitates flexure and thus avoids possible rupture of the thin metal sheet. The dimpled surface also reduces the tendency to panting or diaphragm movement of the sheets.

Small air pockets are formed by the dimpled surface which assists in preventing overheating of the mat or blanket when applied to the member to be insulated.

The mat or blanket may be detachably secured to the member to be insulated by any convenient means, such as lacing wire, straps, hooks, springs or the like.

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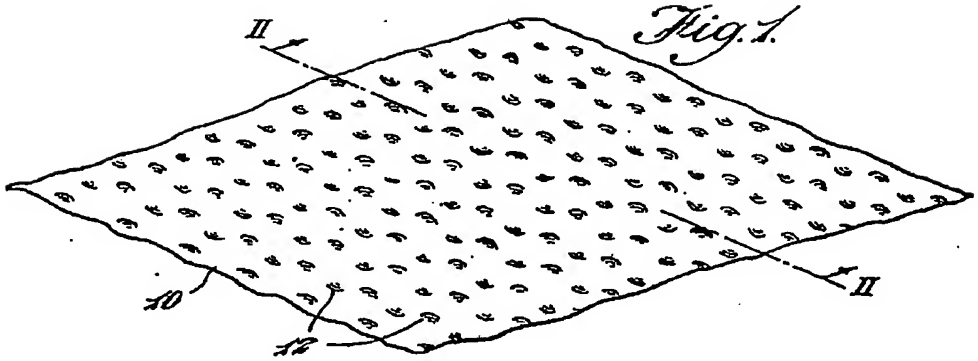
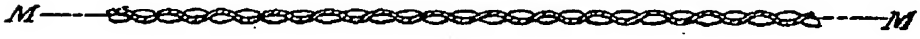


Fig. 1.

Fig. 2.



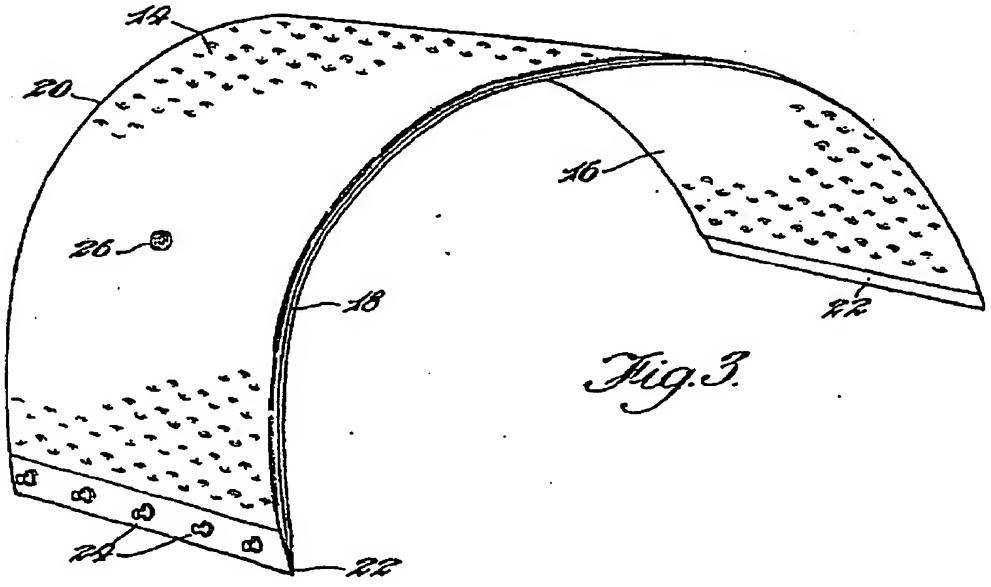


Fig. 3.

797,208 COMPLETE SPECIFICATION
2 SHEETS
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SHEETS 1 & 2

Fig. 4.

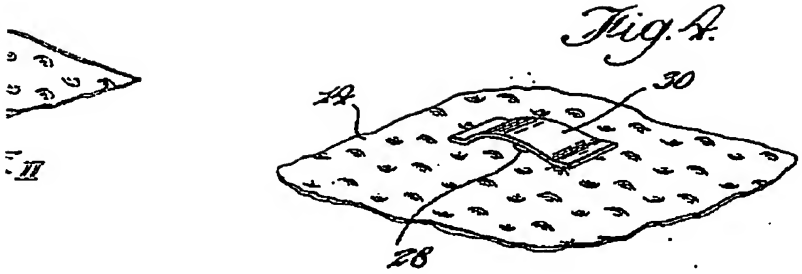

Fig. 5.

Fig. 6.

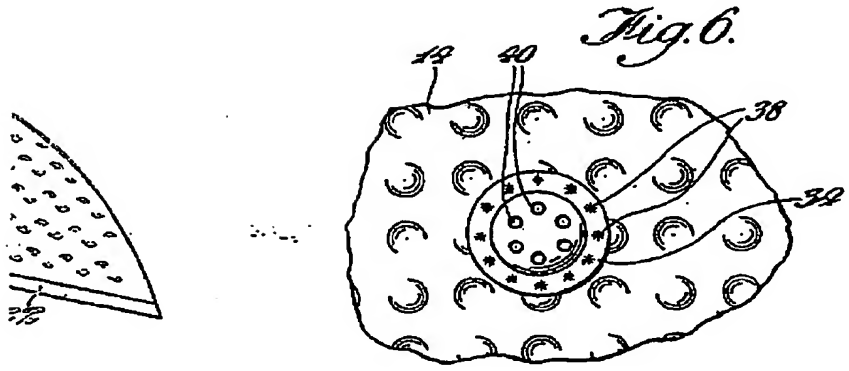

Fig. 7.

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2 SHEETS This drawing is a reproduction of the Original on a reduced scale.
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